tion of cause and effect. And yet it is only in proportion as one is enabled to master this subject that he is prepared to understand, far less to discuss the origin of the present contours of the land.

In the volume which the Duke of Argyll has singled out to bear the brunt of his attack, I carefully stated at the commencement that I proposed to consider the problem only "in so far as it relates to the history of the scenery of Scotland." I laid down no universal law or dogma by which the hills and valleys of every other part of the world were to be explained. I knew the mountains and glens of Scotland; I had wandered over them and studied them from boyhood; trained in the severe and laborious school of the Geological Survey, I had mapped many hundreds of square miles of their surface, across some of the most complicated pieces of geological structure in the kingdom. It was not, therefore, in any spirit of rashness, or novelty, or dogmatism, but with the growing convictions of many years of experience and in the belief that a service to the cause of geological inquiry in this country could be done, that I ventured to launch my little book upon the world. I was well aware that other regions exhibited features not seen here, and that for these other explanations might require to be found. But it was then no part of my subject to travel beyond my own domain. When the principles for which, in common with my able colleagues in the Survey, I contended were firmly established in relation to the scenery of this country, it would then be time to consider how far they were applicable elsewhere. That they would be found to be not merely of local but of wide general import I then held to be probable, and I now know to be profoundly true.

One main object of my chapters was to show how the present hills and valleys of Scotland had come into existence gradually, one by one, during an enormously protracted period of geological waste in the manner to which I have already referred this evening. I adduced copious proofs from all parts of the kingdom in support of this view, similar proofs having been already triumphantly accumulated by Mr. Jukes in Ireland, and by Prof. Ramsay and others in England.

Far from ignoring the influence of geological structure upon external form, I might even have been charged with having brought forward a needlessly ample accumulation of evidence to show how constantly the resulting contours of the country have been determined by the arrangement of the rocks. I showed how ancient, in a geological sense, the denudation of the country had been, and how thoroughly it had done its work upon the surface, no matter whether the rocks had been originally formed as mere soft mud or had been once in actual fusion. I dwelt on the remarkable fact that as a rule the valleys do not run along lines of fracture, and quoted in support of this assertion the published maps of the Geological Survey of the three kingdoms. To these and similar statements of sober fact which are now part of the common stock of geological knowledge, his Grace opposes such phrases as these: "The facts assumed are, in my opinion, to a large extent purely hypothetical," "This assertion is erroneous," "extravagant demands," "inventions and imaginations," and so on.

(*To be continued.*)

NOTES

THE annual meeting of the Fellows of the Royal Society was held on Tuesday at Burlington House. The retiring President, Sir George Biddell Airy, K.C.B., delivered the inaugural address. The presentation of the medals followed. The Copley Medal was awarded to Professor Helmholtz, the distinguished physiologist, physicist, and mathematician, of Berlin, "whose memoirs have ranged through nervous physiology, hydrodynamical theory, instruments (as the ophthalmometer and the ophthalmoscope) for exact measurement and for medical examination of the eye, and other important subjects, and have been generally recognised as giving real additions to our knowledge." A Royal Medal was awarded to Prof. Allman, F.R.S., "for his numerous zoological investigations, and more especially for his work upon the Tubularian Hydroids. The subject of these labours is one upon which few persons are qualified to enter; and the Council are impressed with the delicacy of the work and the value of the scientific results." A Royal medal was awardep to Professor H. E. Roscoe, F.R.S., of Owens College, Marchester, "for his various Chemical Researches, more especially for his investigations of the Chemical Action of Light, and of the Combinations of Vanadium." Dr. Joseph Dalton Hooker, C.B., was elected President of the Society.

THE alleged reply of the Government on the subject of an Arctic Expedition as reported in the daily papers (*Daily Telegraph* and *Pall Mall Gazette*) is calculated to convey a very erroneous impression. Mr. Gladstone has requested that he may be furnished, in writing, with the reasons for the despatch of an Arctic Expedition, before receiving a deputation on the subject. Those reasons, which we believe to be quite conclusive as showing the propriety of despatching an expedition next year, will at once be furnished to the Prime Minister.

PROF. A. W. WILLIAMSON has been elected a Correspondent of the French Academy.

THE Duke of Northumberland has been unanimously elected President of the Royal Institution, in succession to the late Sir Henry Holland.

THE probable arrangements for the Friday Evening Meetings of the Royal Institution before Easter 1874, are as follows:—Jan. 16: The Acoustic Transparency and Opacity of the Atmosphere, by Prof. Tyndall, F.R.S. Jan. 23: Recent Discoveries in Mechanical Conversion of Motion, by Prof. Sylvester, F.R.S. Jan. 30: Weber and his Times, by Sir Julius Benedict. Feb. 6: The Heart and the Sphygmograph, by Alfred H. Garrod, Fellow of St. John's College, Cambridge. Feb. 13: The Opponents of Shakespeare, by Dr. Doran, F.S.A. Feb. 20: The Autotype and other Photographic Processes and Discoveries, by Vernon Heath. Feb. 27: Men of Science, their Nature and Nurture, by Francis Galton, F.R.S. March 6: Venus's Fly-trap, by Dr. J. S. Burdon-Sanderson, F.R.S. March 13: Graphic Representations of Musical Sounds, by M. Cornu. March 20: The Temperature of the Atlantic, by Dr. W. B. Carpenter, F.R.S., Registrar Univ. Lond. March 27: The Physical History of the Rhine, by Prof. A. C. Ramsay, F.R.S., Director of the Geological Survey of Great Britain.

SIR SAMUEL BAKER has quite recovered from his recent indisposition, and will on Monday next address the Royal Geographical Society upon his adventures in Africa.

WE regret to announce the death of M. De La Rive at Marseilles on Nov. 27, on his way to Cannes. He had had an apoplectic fit about a fortnight previously, from which he seemed to be slowly recovering, though greatly shattered in intellect.

WE rejoice to learn that at a convocation held at Oxford on November 27, the grant alluded to in NATURE a fortnight ago in connection with Dr. De La Rue's gift of astronomical apparatus to the University, was acceded to in a manner creditable and gratifying to all concerned. Thus the University has, we believe, established the foundation of what ought to become a very useful Observatory for Astronomical Physics. One immediate result, we hope, will be to excite Cambridge into vigorous action. Oxford deserves great credit for the efforts she has made during the past few years to encourage the study of physical science; we hope the results will lead her to do so to a still greater extent.

THE fund being raised for the purpose of providing a suitable memorial to the late Prof. Sedgwick, of Cambridge University, reaches nearly 10,000*l*. The form of the testimonial will be some new and suitable buildings for the schools of geology, and a full-length statue of the late professor.

THE Cape mail brings word that the *Challenger* has arrived at Simon's Bay. On her voyage from Bahia she touched at Tristan d'Acunha, and made a survey of the groups of islands to which it belongs. Two Germans were found who had lived there for a couple of years, and who gladly availed themselves of the opportunity of leaving.

THE annual course of lectures of the Brown Institution, under the Government of the University of London, will be delivered in the theatre of the University by Dr. Burdon-Sanderson, F.R.S., on successive Tuesdays and Fridays during the present month, at 5 o'clock in the afternoon. The first lecture will be given on Tuesday next the 9th inst.

PROFESSOR E. WEISS, of the Vienna Observatory, we learn from the *Bulletin International* of the Paris Observatory, has identified the comet recently discovered by Coggia, with the first comet of 1818, discovered by Pons at Marseilles.

WE understand that the Lords of the Privy Council on Education have decided to unite the Professorships of General and Applied Chemistry in the Royal College of Science, Dublin, and that this joint professorship will be conferred on Mr. Galloway, for many years the Professor of Applied Chemistry to the College. The only vacancy to be now filled up in the college staff is therefore that of the Professorship of Zoology.

PROF. N. L. SHALER, Geologist of the State of Kentucky, in a recent letter to the *Frankfort Yeoman*, makes a rather novel suggestion for improving the navigation of the Ohio River, and at the same time preventing the enormous destruction of property which its floods now occasion at intervals, by washing away its banks. In what has hitherto proved a vain endeavour to accomplish the former object, a large amount of money has been already spent under appropriations of the United States Congress, for wing-dams and other structures to concentrate the flow during the season of slack water; and schemes have been considered with more or less favour that involved the expenditure of from ten to forty million dollars. The waste by floods, of property bordering the river, is estimated by Prof. Shaler at 400,000 dols. per annum. He thinks that both objects could be accomplished by simply planting willows upon the banks, as he finds that wherever such a plantation has been effected, the resulting growth not only holds the soil in which it is rooted, but accumulates that which is brought down by the river. When the banks have been sufficiently strengthened and extended by means of such plantations, a deepening of the channel must result, which will improve navigation. The entire cost of planting the banks of the river from Pittsburgh to its mouth is estimated by Prof. Shaler at 100,000 dols.

ON Monday, Nov. 24, a meeting of the Royal Geographical Society was held in the theatre of the University of London, Burlington Gardens; Sir Bartle Frere in the chair. Two papers were read—one by Capt. J. Moresby, R.N., "On recent discoveries at the eastern end of New Guinea," and the other by the Rev. W. Wyatt Gill, on three visits to New Guinea. Capt. Moresby's paper entered at much length into the configuration and aspect of the country, which the author described as not unlike that of Australia. From all he saw of the people, the old idea that they were the most savage of all races must be abandoned. Capt. Moresby's paper described the utensils used by the natives, and looked forward to a better future for them in consequence of their connection with England. The Rev. Mr. Gill then related his experience, which in general confirmed that of Capt. Moresby.

THE late Mr. Robert M'Andrew, F.R.S., of Isleworth House, Middlesex, has bequeathed to the University of Cambridge a very large and valuable collection of recent shells. The collection is one of great scientific interest, and is well known to persons engaged in the study of this branch of natural history. Mr. M'Andrew also bequeaths to the University "such of the purely conchological works in my library as the Vice-Chancellor or any Professor or other official nominated by him shall select, provided they are works which the said University does not already possess (otherwise than in the Public Library of the said University), and such works are to be placed in the Natural History Museum or some library connected with it."

A CORRESPONDENT asks whether any of our readers can inform him if there exists any description of a fine section of Rhætic beds which is to be found about half a mile outside the town of Newark-upon-Trent?

WE have received copies of the *New York Tribune* for October 29, 30, 31, containing full reports of the recent meeting of the American Academy of Sciences, in New York. The reports are very detailed, and have evidently been prepared with great care for the *Tribune*, which, moreover, to judge from the numbers referred to, seems to devote something like one-third of its space to matters more or less connected with Science, not to mention literature. We fear this would not pay in this country; it evidently does in America. The American Academy, appears to be a kind of select upper Association for the Promotion of Science. It started with fifty members, and adds only five new members each year; there seems to be but little prearrangement as to the meetings.

THE earthquake on the 9th November, in Western Asia Minor, was rather remarkable. It was felt at 10 A.M. at the Dardanelles and Broossa. It reached to Ak Hissar, Phocæa, and the islands of Samos and Nisyros, in fact from N. to S. At Smyrna a first shock was felt at 9.49 P.M., and another at 3.20 A.M. [of the next day?]. After the first shock a strong smell of sulphur pervaded the atmosphere and entered the houses. A thick mist which had hung about for days dispersed, and the night was clear. Nisyros was supposed to be the centre. At the Dardanelles the shock was preceded by a rumbling noise. At Broossa there was a second shock at 1 P.M. An earthquake was felt on October 10, at 4.45 A.M., at San Salvador, in Central America. It was slight.

THE naturalists connected with the U.S. Yellowstone Expedition of the summer of 1873 have all returned from the field, and are at present engaged in preparing reports for transmission to the Secretary of War. The opportunities furnished by the occasion were not so good as had been hoped for, the region proving to be much more destitute of animal and vegetable life than anticipated. Everything was done, however, by them that the circumstances would allow. The collections embrace a full series of everything met with in the form of animal and vegetable life. The collections of butterflies and of plants were especially rich; of fossils not many were obtained, but among them will doubtless be found some new species. Among these was a large ammonite, 3 ft. in diameter, presented to the party by Lieut. P. H. Ray. A few uncharacteristic bones of fossil vertebrates were picked up, but the expedition failed to reach any of the great bone deposits of the Mauvaises Terres, as they had hoped to do.

We have recently had occasion to notice the fact that the plans of the new observatory at Cincinnati, U.S., had been approved, and were about being carried into execution. It gives us pleasure to record the rapid progress that has been made in this work, as evinced by the fact that on the 28th of August the corner-stone of the new building now in process of erection on Mount Lookout was laid with becoming ceremonies. The site chosen for the new observatory is about four miles north-east of that on Mount Adams, where the original observatory, founded by Prof. O. M. Mitchell, was established. The corner-stone that was laid in 1843 on that elevation by John Quincy Adams has been carefully removed to the new site, and appropriately forms the corner-stone of the new equatorial pier. The observatory has, by means of a tripartite agreement with the city and the heirs of Nicholas Longworth, now passed into the hands of the Cincinnati University. The proceeds, amounting to 50,000 dols., realised on the sale of the property on Mount Adams have been invested for the support of the art department of the university. The city, however, has pledged itself to maintain the observatory when once established, and the establishment has itself been hastened by the liberality of Mr. John Kilgour, who has given four acres of ground as a site for the new building, and added 10,000 dols. for the latter. The site is admirably adapted for the purpose of the institution. It is one of the highest points in the county, commanding a beautiful and extended view, and it is not likely that the difficulty experienced at the old site from the smoke and vapours of the city will for a long time if ever, trouble the astronomers on Mount Lookout. The new edifice faces south, having a width of about sixty feet, a depth of ninety feet, and two wings, making the breadth through the wings about one hundred feet. One of the wings will be used for the meridian instruments; and in the centre of the building, on a brick pier thirty-six feet high and seventeen feet in diameter, will rest the big telescope. The building will be two stories high, except in the centre, where the revolving turret of iron for the equatorial will add half a story. The structure is to be of pressed brick, with freestone trimmings.

The additions to the Zoological Society's collection during the last week include an Arabian Baboon (*Cynocephalus hamadryas*) from Arabia, presented by Miss Sandon; a Wild Cat (*Felis catus*) from Scotland, presented by Sir T. Riddell, Bart.; three Gray's Terrapins (*Clemmys grayi*), and some Moorish Tortoises (*Testudo mauritanica*) from Persa, presented by Hon. E. Ellis; an African Goat (*Capra hircus*) from Bedah, presented by Mr. J. A. Croft; a Macaque Monkey (*Macacus cynomolgus*) from India, presented by Lady Stirling; two Blue-throated Parrots (*Pionus sordidus*) from Venezuela; an Active Amazon (*Chrysotis agilis*) from Jamaica, and a Blackish Sternothere (*Sternothoerus subniger*) from Madagascar, purchased.

SCIENTIFIC SERIALS

The *Journal of Mental Science*, October 1873. This journal is still occupied with only medico-psychological subjects. The Morisonian Lectures on Insanity for 1873 begun in this number are of great interest, and mark the advance of Science in this painfully important branch of knowledge. Nothing, we think, can be more evident than that Dr. Skae proceeds on a scientific principle when he attempts to classify the various forms of insanity according to the bodily disease or condition, as far as it can be ascertained, which proceeds or accompanies the insanity. And it is surprising that even Dr. Maudsley should be found among those who cavil at Dr. Skae's classification, instead of adopting his principle and making the most of it. With insanity Science has made a beginning, but that is all.—In an article by Dr. J. T. Dickson on "The Functions of Brain and Muscle Considered in Relation to Epilepsy" we have a rather singular hypothesis concerning the functional relation of the brain to the muscular system. We cannot afford to indicate this curious theory; we doubt if we quite understand it; but we can inform the scientific world generally, on the authority of Dr. Dickson, that what they have been in the habit of believing on this subject "is not only improbable, but impossible." Dr. Hughlings Jackson has, it seems, been at the pains to quote against Dr. Dickson some passages from Herbert Spencer's Psychology; but he could have little known with whom he had to deal. Dr. Dickson quietly remarks—"From this it would seem that Spencer holds somewhat the same, though the untenable view." Was there ever a finer example of how completely original ideas can free a mind from the degrading thraldom of authority? Does Spencer differ from me? why then that is the worse for Spencer.—The article of most general interest is "The Morbid Psychology of Criminals," by Dr. D. Nicolson, continued from last number, and still unfinished. It abounds in valuable observations, and good practical common sense. When in prison criminals offer good opportunities for observation, but we do not perceive that their "emotional displays" can with strictness be said to mark anything specially morbid. From all that is said, we cannot gather more than that criminals are like the much larger class to which they generally belong, namely people of a low type of mind. The unfortunates that find their way into our prisons are, we regret to think, far from the only people who cannot help insanely acccusing others of wicked designs against them; whose minds are lawless and undisciplined; who must have their "breakings out;" and for whom, when they become intolerably insolent and violent, "a good drubbing on the spot" would be the most appropriate medicine. People, when inclined to what they ought not to do will not be deterred by the fear of punishments that are not painful, or which are too distant to act on their dull imaginations. This leads to large considerations, but we can only say that it would be a great matter for social progress if our tender-hearted philanthropists—those who busy themselves with theories of home, school, and prison discipline, distributing gratis wonderful receipts for the painless cure of all bad habits—could be brought to understand a little better than they do the real nature of the material on which they have to work. The review of the Lunacy Blue Books will be found interesting; also "Antiquarian Scraps relating to Insanity," by Dr. T. W. McDowall.

Journal of the Royal Geological Society of Ireland, vol. xiii., Part 3, for the session 1872–73, contains E. T. Hardman on the occurrence of gypsum in the Keuper Marls, near Coagh, Co. Tyrone.—Prof. T. Rupert Jones, on some Foraminifera from the chalk of the North of Ireland.—P. S. Abraham, notes on the geology of the Hartz.—Prof. Macalister, a description of two Veddah skulls, and Presidential address (which latter gives an able summary of the work done by German petrologists with the object of determining the mineral constitution and structure of plutonic, metamorphic, volcanic and other rocks by the aid of the microscope).—Prof. E. Hull, on the microscopical structure of the Limerick carboniferous Trap Rocks, and on the microscopical structure of Irish granites.—Col. Meadows Taylor, the Coal fields of Central India.—R. J. Cruise, Analysis of the Leitrim coal, remarks on the coal area of the district.—Dr. Studdert, on the Lough Allen coal from the Arigna District, Co. Leitrim.—G. H. Kinahan, on the carboniferous ingenite rocks of the County Limerick.—E. T. Hardman, on the occurrence of siliceous nodular brown Hæmatite (Göthite) in the carboniferous limestone beds near Cookstown, Co. Tyrone, &c., and on an analysis of white chalk from the County of Tyrone, with notes on the occurrence of zinc therein.—Rev. Dr. Macloskie, on the silicified wood of Lough Neagh.—Dr. Tichborne, on the formation of crystalline minerals having the spherical form.

The 2nd and 3rd numbers of the 7th volume of the *Canadian Naturalist* commence with a paper by Dr. Dawson on impressions and footprints of aquatic animals and imitative markings on carboniferous rocks, those considered being invertebrate. The paper originally appeared in *Silliman's Journal*.—Mr. G. F. Mathew continues a description of his impressions of Cuba, and enters into detail respecting the botany of the island.—Mr. Whiteaves gives an account of a deep-sea dredging expedition round the island of Anticosti, in the Gulf of St. Lawrence, in which upwards of 100 species of marine invertebrata new to the Gulf of St. Lawrence were added to the previously recorded fauna.—Dr. Dawson also contributes a paper on the geological relations of the iron ores of Nova Scotia, considering first the bedded ores of the Lower Helderberg series, and of Nictaux and Moose River; next the veins of iron ore of the East River of Pictou, Shubenacadie, and other parts.—Dr. Nicholson, of Toronto, describes some new fossils from the Devonian rocks of